

Receipt date: 10/06/2010

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	SOON HO AHN, et al.)
) Group Art Unit 1795
Serial No.:	10/588,481)
)
Filed:	August 1, 2006)
) Examiner: WEINER, Laura S.
For:	NON-AQUEOUS ELECTROLYTE)
	AND LITHIUM SECONDARY) Confirmation No. 8797
	BATTERY USING THE SAME)

REPLY TO FINAL OFFICE ACTION
UNDER 37 C.F.R. § 1.116, WITH AMENDMENT

Via EFS
Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DO NOT ENTER: /LW/
/LW/ 10/08/2010

Dear Sir:

Applicants respectfully request entry of the following amendment and remarks in response to the Final Office Action dated July 6, 2010.

Amendments to the Claims are reflected in the listing of claims that begin on page 2 of this paper; and

Remarks/Arguments beginning on page 8 of this paper.

1 – 9. (Cancelled)

- i) a lithium salt;
- ii) an electrolyte solvent;
- iii) a first additive compound with an oxidation initiation potential of more than 4.2 V;

iv) a second additive compound with an oxidation initiation voltage of more than 4.2 V, which is higher in oxidation initiation potential than the first additive, and which deposits oxidative products or forms a polymer film, in oxidation,

[illegible]

LEE0082US
FPC04001-PCT/US
LGC-R-02-0229-US

13. (Previously Presented) The nonaqueous electrolyte solution of Claim 12, wherein the oxidation initiation potential of the additives iii) and iv) is 4.5-4.9V.

15. (Cancelled)

the second additive is selected from the group consisting of

CCc1ccccc1

COc1ccc(C)cc1

COc1ccccc1

CCc1ccc(Br)cc1

CC(C)c1ccc(cc1)-c2ccccc2

c1ccc2c(c1)oc3ccccc23

COc1ccccc1-c2ccccc2

CC(=O)OCC=Cc1ccccc1

Fc1ccccc1-c2ccccc2

c1ccsc1






c1ccoc1


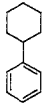



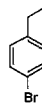
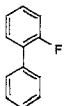
Clc1ccsc1

c1ccsc1

N#CCC1=CC=CC=C1

and

the first additive is selected from the group consisting of , , , , 

and , and the second additive is selected from the group consisting of , , , ,  and .

18. (Previously Presented) A lithium secondary battery comprising the following components:

- a) a cathode capable of absorbing and releasing lithium ions;
- b) an anode capable of absorbing and releasing lithium ions;
- c) a porous separator; and
- d) the nonaqueous electrolyte solution according to Claim 10.

19. (Previously Presented) The lithium secondary battery of Claim 18, wherein the content of the first additive compound is 0.1-2% by weight, and the content of the second additive compound is 0.5-5% by weight.

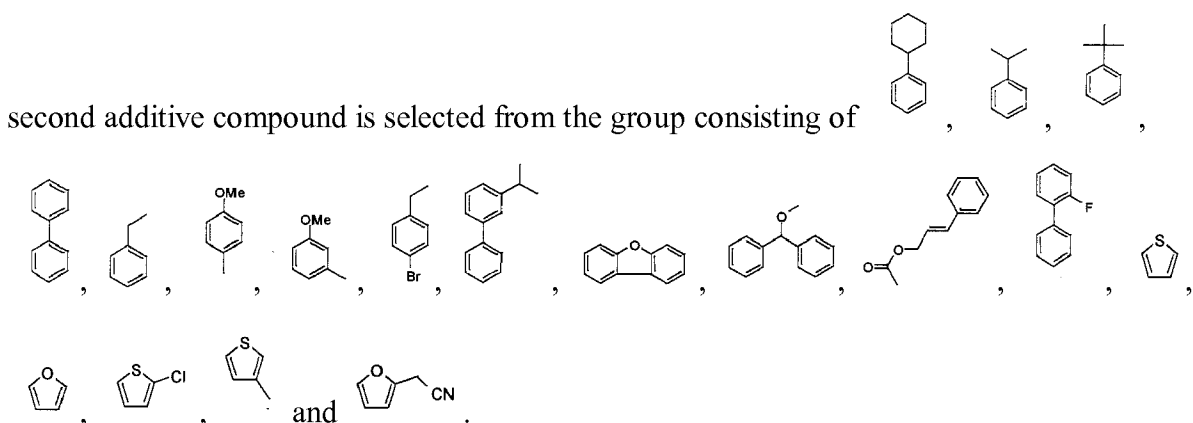
20. (Previously Presented) The lithium secondary battery of Claim 18, wherein the oxidation initiation potential of the additives iii) and iv) is 4.2-5.3V.

21. (Previously Presented) The lithium secondary battery of Claim 20, wherein the oxidation initiation potential of the additives iii) and iv) is 4.5-4.9V.

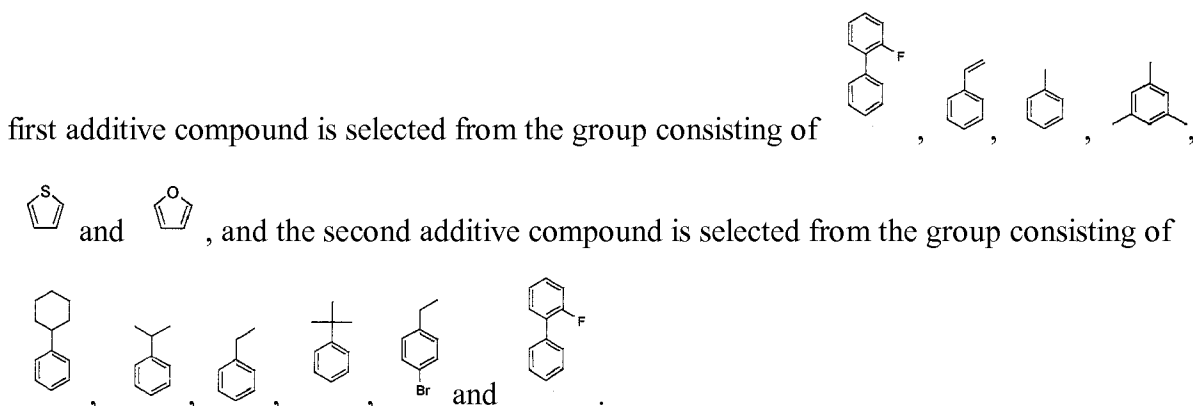
22. (Previously Presented) The lithium secondary battery of Claim 18, wherein the compounds of the additives iii) and iv) with an oxidation initiation potential of more than 4.2V are aromatic compounds with an oxidation initiation potential of more than 4.2 V.

23. (Cancelled)

24. (Previously Presented) The lithium secondary battery of Claim 18, wherein the



25. (Previously Presented) The lithium secondary battery of Claim 18, wherein the



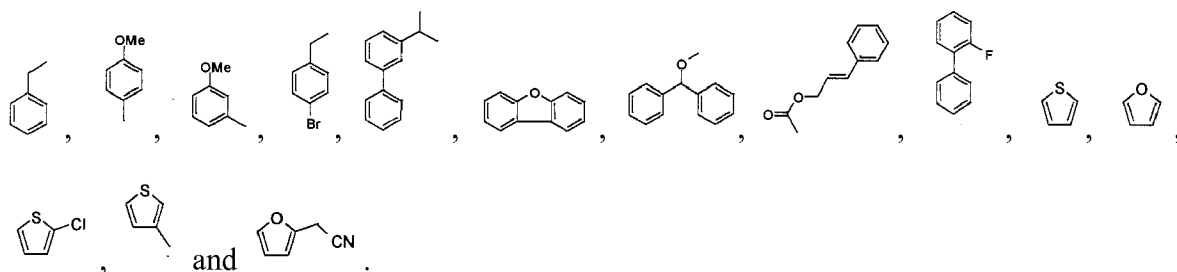
26. (Withdrawn) A nonaqueous electrolyte solution comprising:

- i) a lithium salt;
- ii) an electrolyte solvent;
- iii) a first additive compound with an oxidation initiation potential of more than 4.2 V;

and

iv) a second additive compound with an oxidation initiation voltage of more than 4.2 V, and which is higher in oxidation initiation potential than the first additive, and which deposits oxidative products or forms a polymer film, in oxidation,

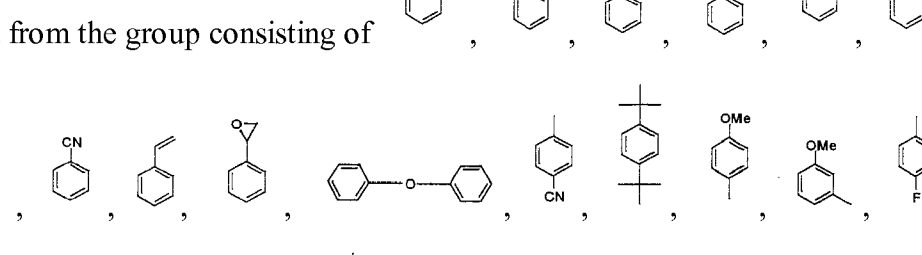
Chemical structures of isopropylbenzene and tert-butylbenzene.



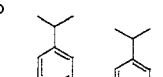
- a) a cathode capable of absorbing and releasing lithium ions;
- b) an anode capable of absorbing and releasing lithium ions;
- c) a porous separator; and
- d) the nonaqueous electrolyte solution according to claim 26.

29. (Withdrawn) The lithium secondary battery of claim 28, wherein the first additive

is selected from the group consisting of



and



REMARKS

Claims 10-25 are pending in the present Application. Claim 10 has been amended, claims 1-9, 15, and 23 have been previously cancelled, and claims 26-29 have been withdrawn, leaving claims 10-14, 16-22, and 24-25 for consideration upon entry of the present Amendment.

Support for the amendment to claim 10 can be found at least in claim 6 as originally filed.

Reconsideration and allowance of the claims are respectfully requested in view of the above amendments and the following remarks.

Claim Rejections Under 35 U.S.C. § 102(b)/(e)/§ 103(a)

Claims 10-14, 16-22, and 24-25 stand rejected under 35 U.S.C. § 102(b)/(e) as being allegedly anticipated by Abe et al. (WO 02/059999/US 7,294,436, hereinafter "Abe") as stated on pages 3-4 of the Office Action dated July 6, 2010. Citations to Abe herein are to the U.S. Patent, U.S. 7,294,436. The Examiner states that Abe teaches all of the elements of claims 10-14, 16-22, and 24-25, including a battery comprising an electrolyte comprising 0.01-10 wt% tert-alkylbenzene and 0.1-1.5 wt% of a biphenyl compound. (Office action dated July 6, 2010, p. 3)

Also, claims 10-14, 16-22, and 24-25 stand rejected under 35 U.S.C. § 102(b)/(e) as anticipated by or, in the alternative, 35 U.S.C. § 103(a) as being allegedly obvious over Abe et al. (WO 02/059999/US 7,294,436, hereinafter "Abe") as stated on pages 4-5 of the Office Action dated July 6, 2010. The Examiner states that Abe teaches all of the elements of claims 10-14, 16-22, and 24-25, including a battery comprising an electrolyte comprising 0.01-10 wt% tert-alkylbenzene and 0.1-1.5 wt% of a biphenyl compound. (Office action dated July 6, 2010, p. 4)

The Applicants respectfully traverse these rejections for at least the following reasons and address them together.

For an obviousness rejection to be proper, the Examiner is expected to meet the burden of establishing why the differences between the prior art and that claimed would have been obvious. (MPEP 2141(III)) “A patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR Int’l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007). To find obviousness, the Examiner must “identify a reason that would have prompted a person of ordinary skill in the art in the relevant field to combine the elements in the way the claimed new invention does.” *Id.*

[illegible]

Abe discloses an electrolyte comprising a tert-alkylbenzene compound and biphenyl. (Abe, col. 3, lines 38-39) Abe states that the tert-alkylbenzene compound preferably has the formula $(R^1)(R^2)(R^3)C-\phi^1$ in which each of R^1 , R^2 , R^3 independently is an alkyl group of 1 to 4 carbon atoms. (Abe, col. 3, line 43)

Abe does not disclose, teach, or suggest a nonaqueous electrolyte wherein the first additive is selected from the claimed group, which does not contain a tert-alkylbenzene. Abe teaches an electrolyte including a tert-alkylbenzene and biphenyl.

Furthermore, the Applicants respectfully assert that the synergistic results disclosed by the Applicants further support the patentability of the instant claims. For example, the Applicants disclose in Examples 6 to 11 the results using the additives isopropylbenzene, vinylbenzene, toluene, mesitylene, thiophene, and furan with biphenyl, ethylbenzene, t-butylbenzene, bromoethylbenzene, cyclohexylbenzene, and fluorobiphenyl, respectively. (Specification, p. 22, Table 4) For at least the reason that Abe does not teach or suggest the first additives isopropylbenzene, vinylbenzene, toluene, mesitylene, thiophene, or furan, one of ordinary skill in the art would not have been prompted to consider adding such compounds to a nonaqueous electrolyte, let alone expect the unexpected and synergistic improvement in overcharge performance disclosed by the Applicants.

Accordingly, for at least these reasons, Abe does not anticipate or render obvious the subject matter of independent claim 10. Claims 11-14, 16-22, and 24-25 depend from claim 10, and thus include the allowable elements of claim 10. Thus the dependent claims are patentable over the cited references for at least the reasons given above for independent claim 10.

Accordingly, reconsideration, withdrawal of the rejection of claims 10-14, 16-22, and 24-25 under 35 U.S.C. § 102(b)/(e), or in the alternative under 35 U.S.C. § 103(a), and allowance of the instant claims are respectfully requested.

Receipt date: 10/06/2010

Application No.: 10/588,481

Response dated: October 6, 2010

Conclusion

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and withdrawal of the objection(s) and rejection(s) and allowance of the case are respectfully requested.

Applicants hereby petition for any necessary extension of time required under 37 C.F.R. 1.136(a) or 1.136(b) or any other necessary fees(s), which may be required for entry and consideration of the present Reply.

If there are any additional charges due with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicants' Attorneys.

Respectfully submitted,

CANTOR COLBURN LLP
Applicants' Attorneys

Date: October 6, 2010

20 Church Street
22nd Floor
Hartford, CT 06103-3207
Telephone (860) 286-2929
Facsimile (860) 286-0115
Customer No.: 23413

By: ____/Grant M. Ehrlich/____
Grant M. Ehrlich, Ph.D.
Registration No. 56,185